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REPORT ON
PERIODIC STRUCTURAL STABILITY ASSESSMENT
POND 001 – CELL 003
THOMAS HILL ENERGY CENTER
CLIFTON HILL, MISSOURI

by Haley & Aldrich, Inc.
Cleveland, Ohio

for Associated Electric Cooperative, Inc.
Clifton Hill, Missouri

File No. 128064-022
October 2021





HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

15 October 2021
File No. 128064-022

Associated Electric Cooperative, Inc.
Thomas Hill Energy Center
5693 Highway F
Clifton Hill, Missouri 65244

Attention: Mr. Curtis Stundebek
Principal Engineer

Subject: Periodic Structural Stability Assessment
Pond 001 - Cell 003
Thomas Hill Energy Center
Clifton Hill, Missouri

Mr. Stundebek:

Enclosed please find our report on the Periodic Structural Stability Assessment (Assessment) for the Associated Electric Cooperative, Inc. (AECI) Pond 001 - Cell 003 (Cell 003) coal combustion residuals (CCR) surface impoundment located at the Thomas Hill Energy Center (THEC) in Clifton Hill, Missouri. This assessment is the 5-year update assessment from the initial version completed previously in October 2016.

We completed an inspection on behalf of AECI on 21 July 2021 and have completed this assessment as a follow up activity. This work was performed by Haley & Aldrich, Inc. (Haley & Aldrich) on behalf of AECI in accordance with the US Environmental Protection Agency's (EPA's) CCR Rule effective 19 October 2015 including subsequent revisions, specifically Code of Federal Regulations Title 40 (40 CFR) §257.73(d).

The scope of our work consisted of the following: 1) obtain and review readily available reports, investigations, plans, and data pertaining to the Cell 003 surface impoundment and appurtenant structures; 2) visit the site to observe Cell 003; 3) evaluate whether the design, construction, operation, and maintenance of Cell 003 are consistent with recognized and generally accepted good engineering practices; and 4) prepare and submit this report presenting the results of our assessment including recommendations and remedial actions.

Associated Electric Cooperative, Inc.

15 October 2021

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Thank you for inviting us to complete this assessment and please feel free to contact us if you wish to discuss the contents of the report.

Sincerely yours,
HALEY & ALDRICH, INC.

A handwritten signature in black ink, appearing to read 'Steven F. Putrich', written over a horizontal line.

Steven F. Putrich, P.E.
Project Principal

Enclosures

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General

1.1 AUTHORITY

Haley & Aldrich, Inc. (Haley & Aldrich) has been contracted by Associated Electric Cooperative, Inc. (AECI) to perform the Periodic Structural Stability Assessment (Assessment) for the AECI Pond 001 – Cell 003 (Cell 003) coal combustion residuals (CCR) surface impoundment located at Thomas Hill Energy Center (THEC) in Clifton Hill, Missouri. This work was completed in accordance with the US Environmental Protection Agency's (EPA's) CCR Rule effective 19 October 2015 including subsequent revisions, specifically Code of Federal Regulations Title 40 (40 CFR) §257.73(d).

1.2 PURPOSE OF STRUCTURAL STABILITY ASSESSMENT

The purpose of this Structural Stability Assessment was to document whether the design, construction, operation, and maintenance of Cell 003 are consistent with recognized and generally accepted good engineering practices. This assessment is the 5-year update assessment from the initial version completed previously in October 2016.

The scope of our work consisted of the following: 1) obtain and review readily available reports, investigations, plans, and data pertaining to the Cell 003 surface impoundment and appurtenant structures; 2) visit the site to observe Cell 003; 3) evaluate whether the design, construction, operation, and maintenance of Cell 003 are consistent with recognized and generally accepted good engineering practices; and 4) prepare and submit this report presenting the results of our evaluation, including recommendations and remedial actions.

Description and Operation of Cell 003

2.1 DESCRIPTION OF CELL 003

Cell 003 is a CCR surface impoundment located to the south of the Thomas Hill power plant. Cell 003 was originally designed by Burns & McDonnell in 1978-1979 and constructed shortly thereafter. It is understood that Cell 003 was modified in 1984. The northeastern portion of Cell 003 (approximately 1.5 acres) was closed via removal of CCR in 2020 to accommodate the Cell 002 reconfiguration and East Ditch construction. This removal activity made no impacts to the impoundment dike and the remainder of the impoundment remains intact and operational consistent with past practices.

Cell 003 is used for wet storage of fly ash¹, bottom ash, boiler slag and sediments from the coal pile runoff. Cell 003 is incised on the east and west sides. On the north side, an embankment with 18-ft crest width separates Cell 003 and the non-CCR Cell 002 impoundment. The embankment is constructed from clay fill obtained from an on-site borrow source. The embankment is underlain by naturally deposited medium stiff to very stiff clay and silty clay. The north interior slope of Cell 003 varies from about 3H:1V to 2H:1V, while the north exterior slope is typically 3H:1V.

On the south side, an embankment with 16-ft crest width separates Cell 003 and Cell 004. The embankment is constructed from clay fill obtained from an on-site borrow source. The embankment is underlain by naturally deposited stiff clay with trace sand, which is in turn underlain by weathered limestone. The south interior and exterior slopes are typically 3H:1V. In 1984, the current south embankment was constructed, and the original embankment was abandoned and left in place. This abandoned original embankment is located north of the interior slope and is submerged at normal pool level.

Cell 003 has a surface area of approximately 9.3 acres based on a normal operating water level of 710. Based on a comparison of the most recent survey performed in 2019 combined with 2020 survey (obtained when the unit was operating with minimal water) to the approximate topography prior to dam construction, the approximate volume of CCR within the unit is 126 acre-ft. The approximate volume of water in the unit at the time of the inspection is 33 acre-ft (obtained by comparing the combined existing topography in Cell 003 to elevation 714.1). Cell 003 has a capacity of approximately 193 acre-ft. based on a comparison of elevation 717 (dam low crest elevation) in the 2019 survey to the approximate topography prior to dam construction.

Cell 003 receives decant water and suspended CCR from Cell 001 via an earthen bypass channel which flows from Cell 001 and around the non-CCR Cell 002 impoundment, discharging into the northwest corner of Cell 003.

The outlet structure from Cell 003 consists of a rectangular concrete drop inlet tower equipped with 60-in. wide concrete stop logs. Decant water entering the structure flows through a pipe that penetrates the common Cell 003/004 embankment and discharges underwater into Cell 004. The Cell 003 emergency spillway consists of an 18-ft wide riprap-lined channel which is approximately 2 ft in depth located across the crest of the south dike. To provide vehicle access across the riprapped channel, the riprap has been topped off with a layer of crushed stone within the limits of access road.

¹ Fly ash is no longer conveyed to Cell 003, however Cell 003 historically received fly ash. The plant dry handles all fly ash.

Accumulated CCR is periodically dredged from Cell 003, generally in odd years, one half of the cell at a time at an approximate 4-year cycle for the full unit.

2.2 OPERATION, MAINTENANCE, AND INSPECTION

Cell 003 and the other cells within the Pond 001 system are operated and managed by AECl personnel in accordance with AECl's "Operating and Management Plan" dated 14 December 2012 (Reference 1).

AECl personnel are conducting 7-day and annual inspections of the Cell 003 impoundment in accordance with EPA's Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257.83. In addition, the impoundment is inspected following heavy rain events. No instrumentation exists in the dike for the 30-day inspection.

Maintenance of the impoundment includes regular mowing of grass, seeding of thinly vegetated areas, control of woody growth, repair of erosion as needed, and inspection of the outlet structure and stoplogs.

Operation includes regulating water levels in the impoundment, regulating and monitoring process water discharge from Cell 001, and periodic dredging of accumulated CCR from the impoundment.

Structural Stability Assessment

3.1 REVIEW OF EXISTING INFORMATION

For this assessment, Haley & Aldrich reviewed multiple sources of information including:

- Report on the Initial Structural Stability Assessment performed by Haley & Aldrich in accordance with 40 CFR §257.73(d), dated October 2016
- Previous Annual Inspections performed by Gredell Engineering Resources in accordance with 40 CFR §257.83
- Report on the Initial Safety Factor Assessment performed by Haley & Aldrich in accordance with 40 CFR §257.73(e), dated October 2016
- Operating and Management Plan
- Topographic plans and aerial photos
- Construction drawings
- Subsurface information
- Geotechnical laboratory test results
- Slope stability evaluations
- Variety of other information in addition to verbal information provided by AECl during our assessment.

Our review included, but was not limited to the references listed in Appendix C.

3.2 SITE VISIT AND FIELD OBSERVATIONS

On 21 July 2021, Haley & Aldrich visited Thomas Hill Energy Center to observe conditions at Cell 003, and to meet with AECl personnel to discuss operations and maintenance of the impoundment. Prior to the site visit, we reviewed previous annual inspection, and previous inspection reports referenced above and listed in Appendix C. At the time of our site visit, Cell 003 was in operation with water levels at the normal operating level.

3.3 STRUCTURAL STABILITY ASSESSMENT

In accordance with 40 CFR §257.73(d), the owner or operator of a CCR surface impoundment must conduct initial and periodic structural stability assessments to determine whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices.

Haley & Aldrich reviewed the information provided to us and visited the site to observe Cell 003. Based on our review of available information and observations during our 21 July 2021 site visit, we have concluded the following in accordance with 40 CFR §257.73(d):

1. §257.73(d)(1)(i): Stable foundations and abutments.

Based on our review of available subsurface information, impoundment inspection reports, geotechnical laboratory test results, slope stability analyses, and observations during our 21 July 2021 site visit, Cell 003 was judged to have stable foundations. The Cell 003 embankments have not exhibited signs of excessive settlement, instability, or other signs of inadequate foundation support.

2. §257.73(d)(1)(ii): Adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown.

The Cell 003 interior slopes are covered with vegetation for the full height of the slopes. Based on observations during our 21 July 2021 site visit, the slope protection on the interior slopes was judged to provide adequate slope protection against surface erosion, wave action and adverse effects from sudden drawdown. The exterior slopes of Cell 003 are vegetated for the full height of the slopes and were judged to have adequate slope protection.

3. §257.73(d)(1)(iii): Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit.

Cell 003 is incised on the east and west sides. Constructed dikes around Cell 003 include the north and south embankments. The north embankment separates Cell 003 and Cell 002, while the south embankment separates Cell 003 and Cell 004.

Construction records are not available for the north and south embankments. However, in 2010, Geotechnology, Inc. performed one test boring and one cone penetrometer sounding through the north embankment, and one test boring and one cone penetrometer sounding through the south embankment. The borings and cone penetrometers were drilled through the embankment fill and into the underlying natural soils. The subsurface explorations indicate the embankment fill in the north embankment consists of stiff clay with trace silt and sand, while the fill in the south embankment consists of medium stiff to stiff clay with varying amounts of silt, sand, and gravel.

During our 21 July 2021 site visit, we observed no evidence of slope instability or other signs of inadequate compaction of the embankment fill. In addition, based on the information reviewed for this Assessment, there has been no historic evidence of slope instability or other signs of inadequate embankment compaction.

Based on our review of subsurface exploration logs, and other available information on the Cell 003 embankments, as well as our observations during the 21 July 2021 site visit, we have concluded the fill used to construct the Cell 003 embankments was likely mechanically compacted.

4. §257.73(d)(1)(iv): Vegetated slopes of dikes and surrounding areas not to exceed a height of six inches above the slope of the dike, except for slopes which have an alternate form or forms of slope protection.

The vegetation on the interior, exterior, and downstream slopes of Cell 003 was generally 12 to 48 inches in height at the time of our 21 July 2021 site visit.

5. §257.73(d)(1)(v)(A): Spillway Erosion Protection – All spillways must be either: (1) Of non-erodible construction and designed to carry sustained flows; or (2) Earth- of grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.

The primary spillway in Cell 003 consists of the concrete decant structure located in the southwest corner of the impoundment. The concrete construction is non-erodible and designed to carry sustained flows.

The emergency spillway in Cell 003 consists of an 18-ft wide riprap-lined channel which is approximately 2 ft in depth located across the crest of the south dike. The emergency spillway channel was judged to have adequate erosion protection to withstand short-term, infrequent flows.

6. §257.73(d)(1)(v)(B): *Spillway Capacity – The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a: (1) Probable maximum flood (PMF) for a high hazard potential CCR surface impoundment; or (2) 1000-year flood for a significant hazard potential CCR surface impoundment; or (3) 100-year flood for a low hazard potential CCR surface impoundment.*

The spillway capacity for the impoundment is required to be modeled and analyzed in accordance with §257.82 Hydrologic and Hydraulic Capacity Requirements for CCR surface impoundments. AECl has completed the Initial Inflow Design Flood Control System Plan and it is available on AECl's CCR compliance website. AECl will complete the Periodic Inflow Design Flood Control System Plan requirement under separate cover, consistent with the CCR Rule Preamble reference to the same section.

7. §257.73(d)(1)(vi): *Hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.*

Cell 003 hydraulic structures include the rectangular concrete decant structure and outlet pipe. Flow entering the decant structure is conveyed through the Cell 003 south embankment and discharges underwater into Cell 004. The decant structure was judged to be in good condition.

The discharge pipe is buried within the south embankment and is not visible. There are no signs of ground settlement above or around the pipe. No sediment or debris was observed at either end of the outlet pipe.

8. §257.73(d)(1)(vii): *For CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.*

There are no natural water bodies in the vicinity of Cell 003. Cell 002 exists immediately to the north (upstream) of Cell 003 and shares the northern edge of Cell 003, while Cell 004 exists immediately to the south (downstream) of Cell 003 and shares the south dike of Cell 003.

The water level in Cell 003 is controlled by AECl using stop logs in the impoundment's outlet structure, thus a rapid drawdown condition is not a realistic possibility without a failure of its own berm. In addition, in 2010, Geotechnology, Inc. performed slope stability analyses on both the north and south embankments of Cell 003 (Reference 5) and confirmed the stability of these embankments. Additional analyses for a Cell 004 sudden drawdown are recommended to confirm the stability of the Cell 003 berm under that unlikely scenario.

9. §257.73(d)(2): *Identify any structural stability deficiencies associated with the CCR unit in addition to recommending corrective measures.*

See Section 4 of this report for a discussion of deficiencies and recommendations.

Impoundment Inspection Assessment and Recommendations

4.1 ASSESSMENT

The following deficiencies were observed at the Cell 003 Impoundment:

1. Tall vegetation consisting of grass and shrubs up to 4 feet high exist on the upstream slopes.
2. Woody vegetation observed in the southwest corner of downstream slope.
3. Tall vegetation up to 4 feet high on downstream slopes.
4. A staff gage is not present for AECl to regularly document the water level in the unit.

4.2 RECOMMENDATIONS

Haley & Aldrich recommends the following remedial measures:

1. Tall vegetation – Cut vegetation and maintain at the required maximum height per the regulations. Maintain in a manner to reduce and control woody vegetation.
2. Woody Vegetation – Remove woody vegetation encroaching on downstream embankment.
3. Tall vegetation – Cut vegetation and maintain at the required maximum height per the regulations. Maintain in a manner to reduce and control woody vegetation.
4. Staff gage – Install staff gage to document water level in unit.

Conclusions/Certification

Based on our review of the information provided to us and observations during our 21 July 2021 site visit, it is our opinion that the design, construction, operation, and maintenance of Pond 001 – Cell 003 at Thomas Hill Energy Center is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded in Cell 003.

I certify that the Periodic Structural Stability Assessment for AECI's Pond 001 – Cell 003 at the Thomas Hill Energy Center was conducted in accordance with the requirements of §257.73(d) of the USEPA's Final CCR Rule.

Signed: _____

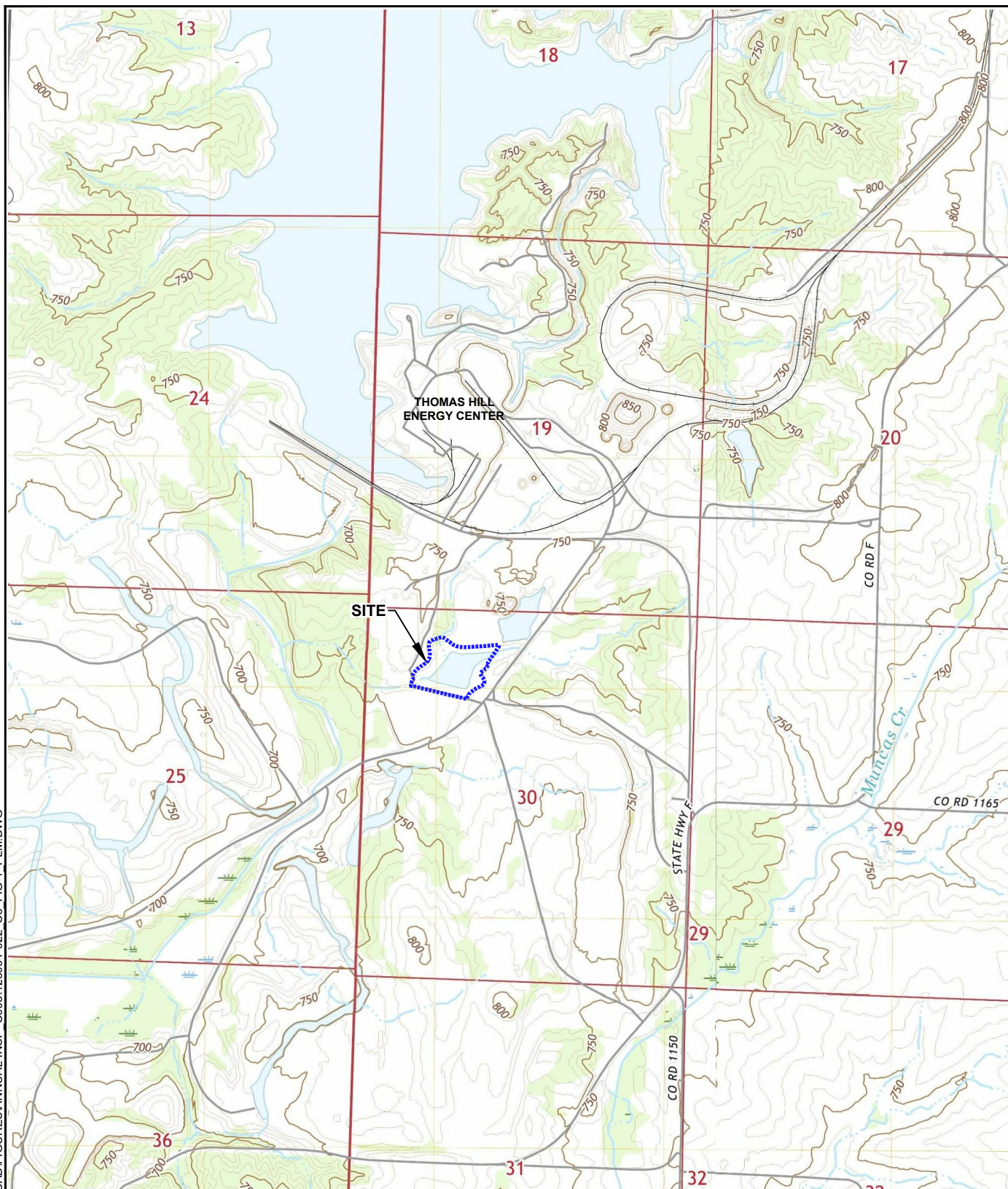


Certifying Engineer

Print Name: Steven F. Putrich
Missouri License No.: 2014035813
Title: Project Principal
Company: Haley & Aldrich, Inc.

Professional Engineer's Seal:





MAP SOURCE:
 PRAIRIE HILL AND COLLEGE MOUND QUADRANGLES
 MISSOURI, 7.5-MINUTE SERIES, 2021



QUADRANGLE LOCATION

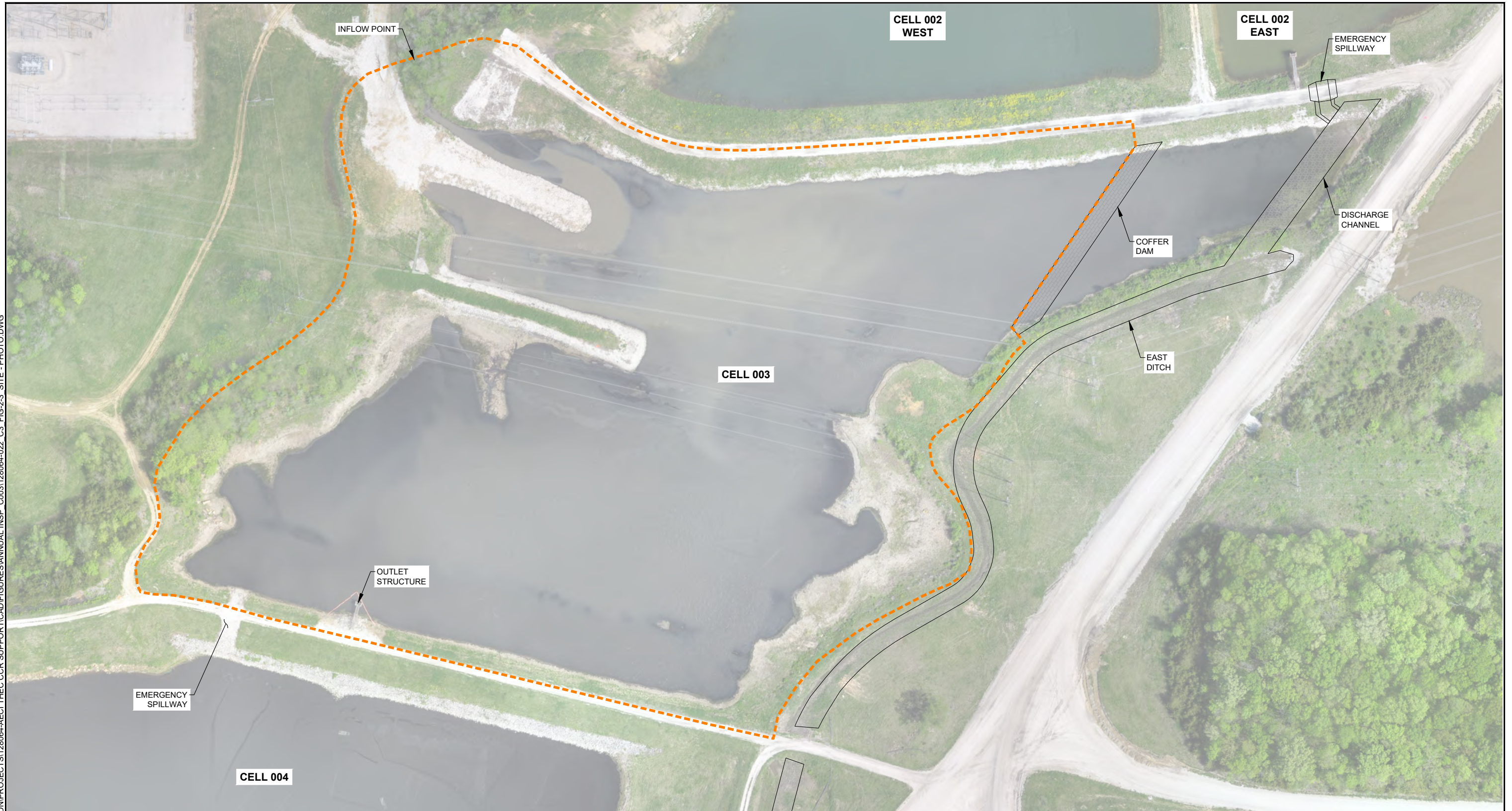
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ANNUAL CCR SURFACE IMPOUNDMENT PE INSPECTION
 ASSOCIATED ELECTRIC COOPERATIVE, INC.
 THOMAS HILL ENERGY CENTER - CELL 003
 CLIFTON HILL, MISSOURI

PROJECT LOCATION MAP

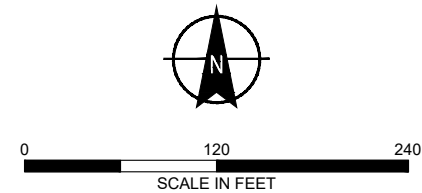
APPROXIMATE SCALE: 1IN = 2000 FT
 AUGUST 2021

FIGURE 1



LEGEND
----- APPROXIMATE LIMITS OF CELL

- NOTES**
1. AERIAL IMAGE FROM HAMPTON, LENZINI, AND RENWICK, INC. (HLR), DATED MAY 08, 2019.
 2. LIMITS OF THE PONDS BASED ON EXISTING TOPOGRAPHY FROM ASSOCIATED ELECTRIC COOPERATIVE, INC. DATED AUGUST 2016. HORIZONTAL CONTROL IS BASED ON NAD83 ZONE 15N. VERTICAL CONTROL IS BASED ON NAVD88.



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ALDRICH**

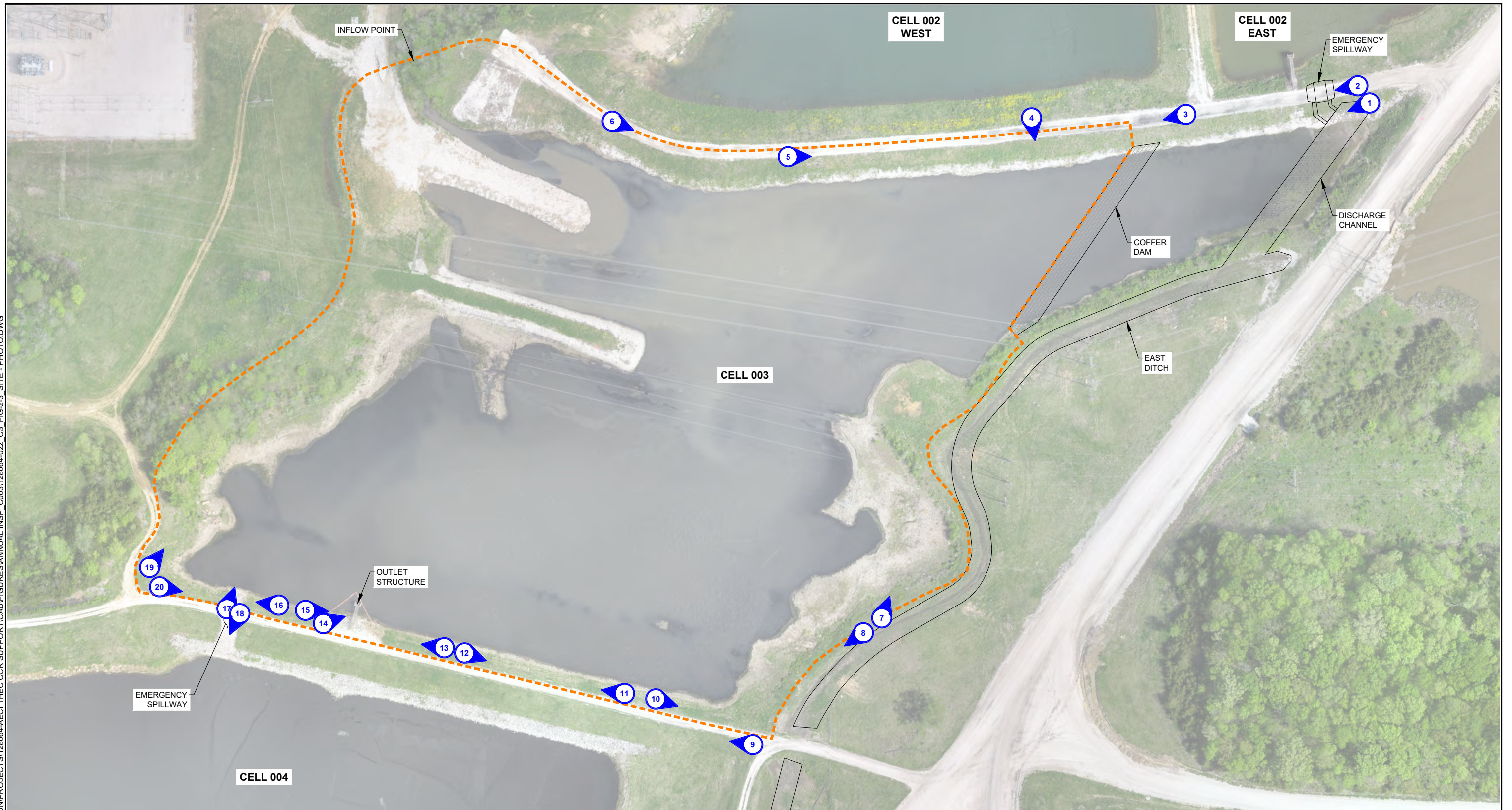
ANNUAL CCR SURFACE IMPOUNDMENT PE INSPECTION
ASSOCIATED ELECTRIC COOPERATIVE, INC.
THOMAS HILL ENERGY CENTER - CELL 003
CLIFTON HILL, MISSOURI

SITE PLAN

SCALE: AS SHOWN
AUGUST 2021

FIGURE 2

VARI, KATALIN
\\HALEYALDRICH\SHARE\EGLE_COMMON\PROJECTS\128064-AECI\THEC CCR SUPPORT\CAD\FIGURES\ANNUAL INSP_C003\128064-022_C3_FIG-2-3_SITE - PHOTO.DWG
Printed: 8/20/2021 5:35 PM Layout: FIGURE 3

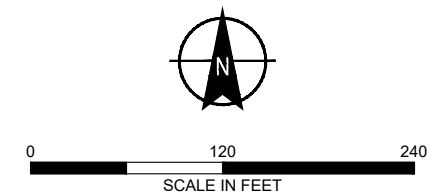


LEGEND

- APPROXIMATE LIMITS OF CELL
- 1 PHOTO LOCATION/DIRECTION

NOTES

1. AERIAL IMAGE FROM HAMPTON, LENZINI, AND RENWICK, INC. (HLR), DATED MAY 08, 2019.
2. LIMITS OF THE PONDS BASED ON EXISTING TOPOGRAPHY FROM ASSOCIATED ELECTRIC COOPERATIVE, INC. DATED AUGUST 2016. HORIZONTAL CONTROL IS BASED ON NAD83 ZONE 15N. VERTICAL CONTROL IS BASED ON NAVD88.



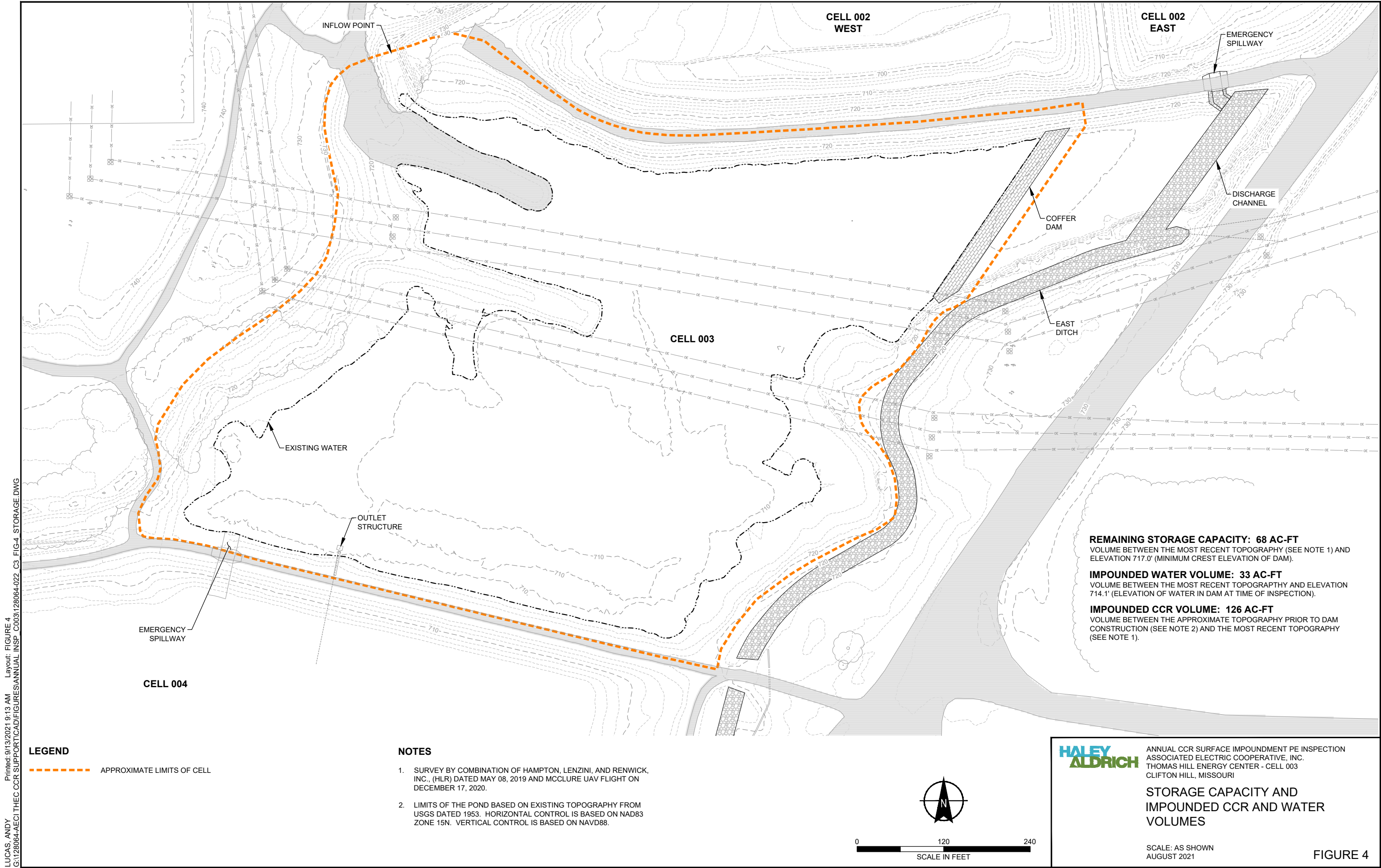
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ANNUAL CCR SURFACE IMPOUNDMENT PE INSPECTION
ASSOCIATED ELECTRIC COOPERATIVE, INC.
THOMAS HILL ENERGY CENTER - CELL 003
CLIFTON HILL, MISSOURI

PHOTO LOCATION PLAN

SCALE: AS SHOWN
AUGUST 2021

FIGURE 3



APPENDIX A

Photographs



Photo No. 1
Vegetation greater than 1 ft along Cell 002 downstream embankment



Photo No. 2
Aggregate surface on Cell 002 embankment crest



Photo No. 3

Tall vegetation along Cell 002 downstream embankment facing west
Aggregate surface along top of Cell 002 embankment crest



Photo No. 4

Monitoring well along Cell 002 embankment



Photo No. 5
Tall vegetation near midpoint of Cell 002 downstream slope



Photograph No. 6
Tall vegetation at northwest corner of Cell 003 facing southeast



Photo No. 7
Tall vegetation southeastern corner of Cell 003 facing north



Photo No. 8
Vegetation greater than 1 ft along upstream slope of Cell 003 embankment



Photo No. 9
Downstream slope and aggregate surface atop Cell 003 embankment



Photo No. 10
Tall vegetation along upstream slope of Cell 003 embankment facing southeast



Photo No. 11

Tall vegetation along upstream slope of Cell 003 embankment facing northwest



Photo No. 12

Tall vegetation along upstream slope at midpoint of Cell 003 embankment facing southeast



Photo No. 13

Tall vegetation along upstream slope at midpoint of Cell 003 embankment facing northwest



Photo No. 14

Cell 003 outlet control structure



Photo No. 15

Tall vegetation southwest corner of upstream slope on Cell 003 embankment facing southeast



Photo No. 16

Tall vegetation southwest corner of upstream slope on Cell 003 embankment facing northwest



Photo No. 17
Cell 003 emergency spillway facing north



Photo No. 18
Cell 003 emergency spillway facing south



Photo No. 19
Tall vegetation along west incised slope



Photo No. 20
Overview of Cell 003 from southwest corner

\\\\haleyaldrich.com\\share\\cle_common\\Projects\\128064-AECI THEC CCR Support\\-022 Cells 001 003 004 Compliance Update\\Structural Stability Assessment\\Cell 003\\Appendices\\2021-0806-Cell 003 Appendix A-Photos-D1.docx

APPENDIX B

Inspection Checklist

DAM SAFETY INSPECTION CHECKLIST

NAME OF DAM: <u>Pond 001 - Cell 003</u>	STATE ID #: <u>MO-0097675</u>
REGISTERED: (YES/NO) <u>No</u>	NID ID #: <u>N/A</u>
STATE SIZE CLASSIFICATION: <u>N/A</u>	STATE HAZARD CLASSIFICATION: <u>Low</u>
	CHANGE IN HAZARD CLASSIFICATION REQUESTED?: (YES/NO) _____
<u><i>DAM LOCATION INFORMATION</i></u>	
CITY/TOWN: <u>Clifton Hill, Missouri</u>	COUNTY/STATE: <u>Randolph / Missouri</u>
DAM LOCATION: <u>5693 Highway F, Clifton Hill, MO</u> (street address if known)	ALTERNATE DAM NAME: <u>N/A</u>
USGS QUAD.: <u>New Madrid, MO-KY</u>	LAT.: <u>39°32.6' N</u> LONG.: <u>92°38.3' W</u>
DRAINAGE BASIN: <u>N/A</u>	RIVER: <u>N/A</u>
IMPOUNDMENT NAME(S): <u>Cell 003</u>	
<u><i>GENERAL DAM INFORMATION</i></u>	
TYPE OF DAM: <u>Earthen Incised and Bermed</u>	OVERALL LENGTH (FT): <u>830</u>
PURPOSE OF DAM: <u>Sedimentation and Storage Basin</u>	NORMAL POOL STORAGE (ACRE-FT): <u>126</u>
YEAR BUILT: <u>1984</u>	MAXIMUM POOL STORAGE (ACRE-FT): <u>193</u>
STRUCTURAL HEIGHT (FT): <u>25</u>	EL. NORMAL POOL (FT): <u>710.0</u>
HYDRAULIC HEIGHT (FT): <u>23</u>	EL. MAXIMUM POOL (FT): <u>717.0</u>
RESERVOIR SURFACE AREA (ACRES): <u>13</u>	WINTER DRAWDOWN (FT BELOW NORMAL POOL) <u>0.0</u>
PUBLIC ROAD ON CREST: <u>No</u>	DRAWDOWN VOL. (AC-FT) <u>0.0</u>
PUBLIC BRIDGE OVER SPILLWAY: <u>No</u>	

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>
<u>INSPECTION SUMMARY</u>		
DATE OF INSPECTION: <u>July 21, 2021</u>		DATE OF PREVIOUS INSPECTION: <u>August 28, 2020</u>
TEMPERATURE/WEATHER: <u>Sunny, 78</u>	ARMY CORPS PHASE I: No (YES/NO) If YES, date _____	
CONSULTANT: <u>Haley & Aldrich, Inc.</u>	PREVIOUS ALT. PHASE I: No (YES/NO) If YES, date _____	
BENCHMARK/DATUM: <u>NAVD88</u>		
OVERALL PHYSICAL CONDITION OF DAM: _____		
DATE OF LAST REHABILITATION: <u>N/A</u>		
SPILLWAY CAPACITY: <u>N/A</u>		
EL. POOL DURING INSP.: <u>714.1</u>		EL. TAILWATER DURING INSP.: <u>701.4</u>
<u>PERSONS PRESENT AT INSPECTION</u>		
<u>NAME</u>	<u>TITLE/POSITION</u>	<u>REPRESENTING</u>
Andy Lucas	Senior Engineer	Haley & Aldrich, Inc.
Matthew Krakora	Staff Engineer	Haley & Aldrich, Inc.
Curtis Stundebek	Principal Engineer	AECI - Thomas Hill Energy Center

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>	
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>	
OWNER: ORGANIZATION	<u>AECI - Thomas Hill Energy Center, Inc.</u>	CARETAKER: ORGANIZATION	<u>AECI - Thomas Hill Energy Center, Inc.</u>
NAME/TITLE	<u>Jenny Jones</u>	NAME/TITLE	<u>Curtis Stundebeck</u>
STREET	<u>5693 Highway F</u>	STREET	<u>5693 Highway F</u>
TOWN, STATE, ZIP	<u>Clifton Hill, Missouri 65244</u>	TOWN, STATE, ZIP	<u>Clifton Hill, Missouri 65244</u>
PHONE	<u> </u>	PHONE	<u> </u>
EMERGENCY PH. #	<u> </u>	EMERGENCY PH. #	<u> </u>
FAX	<u> </u>	FAX	<u> </u>
EMAIL	<u>jjones@aeci.org</u>	EMAIL	<u>cstundebeck@aeci.org</u>
OWNER TYPE	<u>Private</u>		
PRIMARY SPILLWAY TYPE	<u>Decant structure</u>		
SPILLWAY LENGTH (FT)	<u>N/A</u>	SPILLWAY CAPACITY (CFS)	<u>N/A</u>
AUXILIARY SPILLWAY TYPE	<u>N/A</u>	AUX. SPILLWAY CAPACITY (CFS)	<u>N/A</u>
NUMBER OF OUTLETS	<u>One</u>	OUTLET(S) CAPACITY (CFS)	<u>Unknown</u>
TYPE OF OUTLETS	<u>One decant</u>	TOTAL DISCHARGE CAPACITY (CFS)	<u>Unknown</u>
DRAINAGE AREA (SQ MI)	<u>0.23</u>	SPILLWAY DESIGN FLOOD (PERIOD/CFS)	<u>Unknown</u>
HAS DAM BEEN BREACHED OR OVERTOPPED? (YES/NO):	<u>No</u>	IF YES, PROVIDE DATE(S)	<u> </u>
FISH LADDER (LIST TYPE IF PRESENT)	<u>No</u>		
DOES CREST SUPPORT PUBLIC ROAD? (YES/NO)	<u>No</u>	IF YES, ROAD NAME:	<u> </u>
PUBLIC BRIDGE WITHIN 50' OF DAM? (YES/NO):	<u>No</u>	IF YES, ROAD/BRIDGE NAME:	<u> </u>
		MHD BRIDGE NO. (IF APPLICABLE)	<u> </u>

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>			
EMBANKMENT (CREST)					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
CREST	1. SURFACE TYPE	Aggregate and grassy vegetation	X		
	2. SURFACE CRACKING	None observed	X		
	3. SINKHOLES, ANIMAL BURROWS	None observed	X		
	4. VERTICAL ALIGNMENT (DEPRESSIONS)	None observed	X		
	5. HORIZONTAL ALIGNMENT	None observed	X		
	6. RUTS AND/OR PUDDLES	None observed	X		
	7. VEGETATION (PRESENCE/CONDITION)	Mowed grass	X		
	8. ABUTMENT CONTACT	N/A	X		
ADDITIONAL COMMENTS: _____ _____ _____ _____ _____					

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>Juy 21, 201</u>		NID ID #: <u>N/A</u>			
EMBANKMENT (D/S SLOPE)					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S SLOPE	1. WET AREAS (NO FLOW)	None observed	X		
	2. SEEPAGE	None observed	X		
	3. SLIDE, SLOUGH, SCARP	None observed	X		
	4. EMB.-ABUTMENT CONTACT	N/A	X		
	5. SINKHOLE/ANIMAL BURROWS	None observed	X		
	6. EROSION	None observed	X		
	7. UNUSUAL MOVEMENT	None observed	X		
	8. VEGETATION (PRESENCE/CONDITION)	Areas vegetated by grasses and brush up to 4 ft tall			X
		Woody vegetation observed along the southwest embankment			X
ADDITIONAL COMMENTS: _____ _____ _____ _____ _____					

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>			
EMBANKMENT (U/S SLOPE)					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
U/S SLOPE	1. SLIDE, SLOUGH, SCARP	None observed	X		
	2. SLOPE PROTECTION TYPE AND COND.	None observed	X		
	3. SINKHOLE/ANIMAL BURROWS	None observed	X		
	4. EMB.-ABUTMENT CONTACT	None observed	X		
	5. EROSION	None observed	X		
	6. UNUSUAL MOVEMENT	None observed	X		
	7. VEGETATION (PRESENCE/CONDITION)	Areas vegetated by grasses and brush up to 4 ft tall			X
ADDITIONAL COMMENTS: _____ _____ _____ _____ _____ _____ _____ _____ _____					

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>			
INSTRUMENTATION					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
INSTR.	1. PIEZOMETERS	Piezometers observed along downstream area	X		
	2. OBSERVATION WELLS	Wells observed along downstream area	X		
	3. STAFF GAGE AND RECORDER	None observed	X		
	4. WEIRS	None observed	X		
	5. INCLINOMETERS	None observed	X		
	6. SURVEY MONUMENTS	None observed	X		
	7. DRAINS	None observed	X		
	8. FREQUENCY OF READINGS	Quarterly	X		
	9. LOCATION OF READINGS	AECT's operating record	X		
ADDITIONAL COMMENTS: _____ _____ _____ _____ _____					

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>			
DOWNSTREAM AREA					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S AREA	1. ABUTMENT LEAKAGE	N/A			
	2. FOUNDATION SEEPAGE	None observed	X		
	3. SLIDE, SLOUGH, SCARP	None observed	X		
	4. WEIRS	N/A	X		
	5. DRAINAGE SYSTEM	N/A	X		
	6. INSTRUMENTATION	N/A	X		
	7. VEGETATION	Areas vegetated by grasses and brush up to 4 ft tall			X
	8. ACCESSIBILITY	Difficult in some areas due to rip-rap and dense vegetation		X	
ADDITIONAL COMMENTS: <u>Cell 004 is directly downstream of Cell 003</u> <hr/> <hr/> <hr/> <hr/>					

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>			
PRIMARY SPILLWAY					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
SPILLWAY	SPILLWAY TYPE	Decant structure	X		
	WEIR TYPE	Concrete stoplogs in decant structure	X		
	SPILLWAY CONDITION	Fair	X		
	TRAINING WALLS	None observed	X		
	SPILLWAY CONTROLS AND CONDITION	None observed	X		
	UNUSUAL MOVEMENT	None observed	X		
	APPROACH AREA	Fair	X		
	DISCHARGE AREA	Fair.	X		
	DEBRIS	None observed	X		
	WATER LEVEL AT TIME OF INSPECTION	714.1	X		
ADDITIONAL COMMENTS: _____ _____ _____ _____ _____					

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>July 22, 2021</u>		NID ID #: <u>N/A</u>			
OUTLET WORKS					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
OUTLET WORKS	TYPE	Outlet unable to be inspected. Downstream submerged in Cell 004.	X		
	INTAKE STRUCTURE	Decant structure with stoplogs	X		
	TRASHRACK	N/A	X		
	PRIMARY CLOSURE	N/A	X		
	SECONDARY CLOSURE	N/A	X		
	CONDUIT	N/A	X		
	OUTLET STRUCTURE/HEADWALL	Unable to be inspected	X		
	EROSION ALONG TOE OF DAM	None observed	X		
	SEEPAGE/LEAKAGE	None observed	X		
	DEBRIS/BLOCKAGE	None observed	X		
	UNUSUAL MOVEMENT	None observed	X		
	DOWNSTREAM AREA	Vegetation exceeding 6-in. Ground surface not visible in areas.	X		
	MISCELLANEOUS				
ADDITIONAL COMMENTS: _____ _____ _____ _____ _____					

Note: Use additional sheets for additional outlets.

NAME OF DAM: <u>Pond 001 - Cell 003</u>		STATE ID #: <u>MO-0097675</u>			
INSPECTION DATE: <u>July 21, 2021</u>		NID ID #: <u>N/A</u>			
UNDERLYING HYDRAULIC STRUCTURES/PIPES					
AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
UNDERLYING HYDRAULIC STRUCTURES /PIPES	TYPE	Not observed	X		
	INLET				
	CONDUIT				
	OUTLET STRUCTURE/HEADWALL	Fair	X		
	EROSION ALONG STRUCTURE	None present	X		
	SEEPAGE/LEAKAGE	None present	X		
	DEBRIS/BLOCKAGE	None present	X		
	UNUSUAL MOVEMENT				
	DOWNSTREAM AREA				
	MISCELLANEOUS				
ADDITIONAL COMMENTS: <u>Outlet pipe unable to be inspected. Downstream end of outlet was submerged in Cell 004.</u> <div style="border-bottom: 1px solid black; height: 15px; margin-top: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-top: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-top: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-top: 5px;"></div>					

Note: Use additional sheets for additional outlets.

APPENDIX C

References

References

1. Haley & Aldrich, Inc., "Initial Periodic Structural Stability Assessment, Pond 001 – Cell 003," dated 17 October 2016.
2. Gredell Engineering Resources, Inc., "Report: Pond 001, Cell 003 Professional Engineering Annual Inspection of CCR Impoundment," dated 2017, 2018, 2019, and 2020.
3. Haley & Aldrich, Inc., "Initial Safety Factor Assessment, Cells 001, 003, and 004," dated 17 October 2016. Burns & McDonnell, Various Construction Drawings, dated 1979 and 1984.
4. GEI Consultants, "Specific Site Assessment for Coal Combustion Waste Impoundments at Thomas Hill Energy Center," dated June 2011.
5. Geotechnology, Inc., "Global Stability Evaluation, Mine Waste and Ash Pond Embankments, AECI Facilities, Bee Veer and Thomas Hill, Missouri," dated 22 April 2010.
6. Gredell Engineering Resources, Inc., "CCR Separation Berm - Pond 001 Cell 2 – 2015, Project Description and Specifications," dated 1 October 2015.
7. Gredell Engineering Resources, Inc., "Pond 001 Cell 2 Separation Berm" Design and Construction Summary Report, dated November 2015.
8. Gredell Engineering Resources, Inc., "Ash Pond 001 Cell 2 Separation Berm" Construction Drawings, dated October 2015.